

Phytophagous mites (Tetranychoidae: Tetranychidae, Tenuipalpidae) from natural vegetations in Lara, Venezuela

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Abstract: Phytophagous mites from natural vegetation have been scarcely studied in Venezuela. Surveys were carried out from March 2007 to November 2008 to determine diversity of phytophagous mites inhabiting in different plant taxa in Iribarren, Jiménez, Palavecino, Morán and Crespo municipalities from Lara state, Venezuela. In each sampling site, a 500 m- transect was established and the most frequent plant species were sampled. In field, 15 leaves were examined for mite presence by using hand lens. In laboratory, plant material was examined under magnification and mite morpho-species belonging to tetranychid and tenuipalpid were picked up. A total of two tenuipalpid species and eight tetranychid species were identified. Tenuipalpid mites identified were *Brevipalpus phoenicis* (Geijskes) on *Cassia siamea* (Caesalpinaceae), *Capparis linearis* (Capparidaceae), *Spathodea campanulata* (Bignoniaceae), *Randia* sp. (Rubiaceae), *Melicoccus bijugatus* (Sapindaceae) and *Tenuipalpus* sp. was collected from *Spondias mombin* (Anacardiaceae). On the other hand, tetranychid included *Tetranychus urticae* Koch on *Terminalia catappa* (Combretaceae), *Euphorbia pulcherrima* (Euphorbiaceae) and *Enterolobium cyclocarpum* (Mimosaceae). *Tetranychus cinnabarinus* (Boisduval) on *Lycopersicon* sp. (Solanaceae), *Ipomoea* sp., *Convolvulus* sp. (Convolvulaceae) and *Leonotis nepetifolia* (Lamiaceae). *Tetranychus desertorum* Banks on *Parthenium hysterophorus* (Asteraceae). *Eutetranychus banksi* (McGregor) on *C. siamea*, *Chlorophora tinctoria* (Moraceae), *Dalechampia* sp. (Euphorbiaceae) and *Malpighia glabra* (Malpighiaceae). *Eotetranychus* cf. *willamettei* on *Sterculia apetala* (Sterculiaceae). *Oligonychus biharensis* (Hirst) on *Clitoria* sp. (Papilionaceae) and *Ziziphus cyclocardia* (Rhamnaceae). *Oligonychus* sp. on *S. campanulata* and *Neotetranychus gloriosus* Estebanes & Baker on *Croton* sp. (Euphorbiaceae). In this study, *B. phoenicis* is recorded for the first time on *C. siamea*, *S. campanulata*, *Randia* sp. and *M. bijugatus* for Venezuela.

Keywords: *Tetranychidae, Tenuipalpidae, trees, shrubs, herbs.*

VÁSQUEZ, C., MONDRAGÓN, A., DÁVILA, M. & APONTE, O. **Ácaros fitófagos (Tetranychoidae: Tetranychidae, Tenuipalpidae) de vegetación natural en Lara, Venezuela.** *Biota Neotrop.* 9(4): <http://www.biotaneotropica.org.br/v9n4/es/abstract?article+bn01309042009>.

Resumen: Los ácaros fitófagos de especies vegetales no cultivadas han sido poco estudiados en Venezuela. Desde marzo 2007 hasta noviembre del 2008, se realizaron muestreos para determinar la diversidad de ácaros fitófagos habitantes de diferentes taxa vegetales en los municipios Iribarren, Jiménez, Palavecino, Morán y Crespo en el estado Lara, Venezuela. En cada sitio de muestreo, se trazó una transecta de 500 m de longitud donde fueron muestreadas las plantas más frecuentes. En el campo, 15 hojas fueron examinadas para determinar la presencia de ácaros con el uso de una lupa de mano. En el laboratorio, el material vegetal fue examinado bajo aumento de una lupa estereoscopio para seleccionar las morfo-especies de tetraníquidos y tenuipálpidos. Se identificaron dos especies de Tenuipalpidae y ocho de Tetranychidae. Los ácaros tenuipálpidos identificados fueron *Brevipalpus phoenicis* (Geijskes) sobre *Cassia siamea* (Caesalpinaceae), *Capparis linearis* (Capparidaceae), *Spathodea campanulata* (Bignoniaceae), *Randia* sp. (Rubiaceae), *Melicoccus bijugatus* (Sapindaceae) y *Tenuipalpus* sp. fue colectado sobre *Spondias mombin* (Anacardiaceae). Por otra parte, las especies de tetraníquidos incluyeron a *Tetranychus urticae* Koch sobre *Terminalia catappa* (Combretaceae), *Euphorbia pulcherrima* (Euphorbiaceae) y *Enterolobium cyclocarpum* (Mimosaceae). *Tetranychus cinnabarinus* (Boisduval) sobre *Lycopersicon* sp. (Solanaceae), *Ipomoea* sp., *Convolvulus* sp. (Convolvulaceae) y *Leonotis nepetifolia* (Lamiaceae). *Tetranychus desertorum* Banks sobre *Parthenium hysterophorus* (Asteraceae). *Eutetranychus banksi* (McGregor) sobre *C. siamea*, *Chlorophora tinctoria* (Moraceae), *Dalechampia* sp. (Euphorbiaceae) y *Malpighia glabra* (Malpighiaceae). *Eotetranychus* cf. *willamettei*

sobre *Sterculia apetala* (Sterculiaceae), *Oligonychus biharensis* (Hirst) sobre *Clitoria* sp. (Papilionaceae) y *Ziziphus cyclocardia* (Rhamnaceae). *Oligonychus* sp. sobre *S. campanulata* y *Neotetranychus gloriosus* Estebanes & Baker sobre *Croton* sp. (Euphorbiaceae). En el presente estudio, se registra por primera vez a *B. phoenicis* sobre *C. siamea*, *S. campanulata*, *Randia* sp. y *M. bijugatus* en Venezuela.

Palabras clave: Tetranychidae, Tenuipalpidae, árboles, arbustos, hierbas.

Introduction

It has been suggested that plant diversity is a critical factor determining animal diversity (Hunter and Price 1992), however, this relationship between plant and herbivore diversity could be nonlinear, because herbivore loads are often lower in polycultures due to differences in the ability of herbivores to locate host plant in mixed stands, suitability of smaller patches of hosts plants and/or differences of effects of parasites or predators on phytophagous population levels (Andow 1991). This could be true for natural tropical ecosystems. However, although plant diversity could influence arthropod diversity, parasitoid or predator effects seems to be more strongly correlated with predator diversity (Siemann et al. 1998).

Regarding to mite studies, more attention has been paid in determining host preferences and distribution of phytophagous mites species associated to crops, such as vegetables and fruit trees, which are included in Tetranychidae, Tenuipalpidae and Eriophyidae (Jeppson et al. 1975). Furthermore, most of those species are also able to be associated to plant species growing in natural ecosystems. However, there are few studies dealing to acarofauna on wild plants. Neotropic constitutes one of the most diverse region, including microarthropod species (Walter & Behan-Pelletier 1999), however, mite richness species, including those inhabiting on natural vegetation, has been scarcely studied. Feres et al. (2005) found several species belonging to *Eotetranychus* (4), *Neotetranychus* (2), *Oligonychus* (5) and *Tetranychus* (3), being *Tetranychus ludeni* (Zacher, 1913) the most frequent species collected on 15 plant species from the Estação Ecológica do Noroeste Paulista" (São José do Rio Preto, State of São Paulo, Brazil). Similarly, Buosi et al. (2006) reported two *Brevipalpus* and seven *Tenuipalpus* species and also several tetranychid mite species belonging to *Eotetranychus* (1), *Oligonychus* (3) and *Tetranychus* (3) in the "Estação Ecológica de Paulo de Faria", northern region of the State of São Paulo, Brazil. Castro & Moraes (2007) evaluated role of the Atlantic forest vegetation type as reservoir of mite richness which is commonly found on agricultural important plants. These authors found the most frequent group of phytophagous mites was Tenuipalpidae, while the most diverse group was represented by Tetranychid species. Conversely, Lofego & Moraes (2006) found that Tydeidae, Phytoseiidae and Tarsonemidae were the most diverse and frequent mite groups on Myrtaceae species in a Cerrado in São Paulo state, meanwhile Tetranychidae and Tenuipalpidae were scarcely recovery in this area.

In Venezuela, there are extensive areas with natural vegetation with an important number of flora and fauna species, which they are still not well known. In this study, we evaluated diversity of some phytophagous mites belonging to the most important mite families, such as Tetranychidae and Tenuipalpidae, inhabiting in trees, shrubs and herbs from several locations in State of Lara.

Materials and Methods

Monthly surveys to identify phytophagous mites species from natural plants (trees, shrubs and herbs) were conducted at Barquisimeto (10° 3' 49,2" N and 69° 18' 56,3" W) in Iribarren Municipality, Quibor (9° 55' 39" N and 69° 37' 43" W) and Campo Lindo (9° 57' 27" N and 69° 34' 26" W) in Jimenez Municipality, Humocaro Bajo (9° 36' 29,6" N and 69° 59' 03,6" W) in Morán Municipality,

Cabudare (10° 03' 45,9" N and 69° 05' 24,03" W) in Palavecino Municipality, and Duaca (10° 14' 41,6" N and 69° 15' 22,7" W) in Crespo Municipality from state of Lara, Venezuela from March 2007 to November-2008. In each sampling site, a 500 m transect was established and the most frequent plant species were sampled. In field, 15 leaves were examined for mite presence by using hand lens. When mites belonging to Tetranychidae or Tenuipalpidae were detected, leaves and twigs were selected; samples were placed in plastic bags and taken in ice box to the Laboratorio de Zoología Agrícola, at Universidad Centroccidental Lisandro Alvarado, state of Lara, Venezuela. In laboratory, plant material was examined under magnification and mite morpho-species belonging to tetranychid and tenuipalpid were picked up using an entomological pin. Then slides for microscopic observations were prepared using Hoyer Medium. Finally, slides were oven dried, sealed and labeled. Mite species were determined by taxonomical keys or by morphological comparisons with vouchers specimens deposited in the Colección de Acarología, Universidad Central de Venezuela.

Results and Discussion

A total of two species belonging to Tenuipalpidae and eight to Tetranychidae were recorded. Tenuipalpid mites included *Brevipalpus phoenicis* (Geijskes, 1939) and *Tenuipalpus* sp., meanwhile in Tetranychid were recorded *Tetranychus urticae* Koch, 1836, *Tetranychus cinnabarinus* (Boisduval, 1987), *Tetranychus desertorum* Banks, 1900, *Eutetranychus banksi* (McGregor, 1914), *Eotetranychus* cf. *willamettei*, *Oligonychus biharensis* (Hirst, 1924), *Oligonychus* sp., *Neotetranychus gloriosus* Estebanes & Baker, 1968 (Table 1). Furthermore, higher number of specimens was found in *Eotetranychus* cf. *willamettei*, *E. gloriosus*, *Tenuipalpus* sp., *E. banksi* and *T. urticae*.

TENUIPALPIDAE

B. phoenicis was collected in five host plant species belonging to different botanical families. According to Childers et al. (2003), *B. phoenicis* has 486 plant species reported as hosts. Our results showed this species has not been previously recorded in *Cassia siamea* Lam., *Spathodea campanulata* P. Beauv., *Randia* sp. or *Melicoccus bijugatus* Jacq., thus it constitute a new host plants record for Venezuela.

Regarding to *Tenuipalpus* sp., it is morphologically similar to *Tenuipalpus uvae* DeLeon, 1962 which was also collected from non determined plant tree, referred as a large tree (with pinnate leaves and small white flowers in racemes) called "uva" by the inhabitants in Mexico (Baker et al. 1975) and from *Spondias purpurea* L. in Costa Rica (Salas & Ochoa 1986, Mairena & Ochoa 1989). So that, observed differences could be considered intraspecific variations due to host and geographic conditions, however, more extensive taxonomic studies are required to determine real status of specimens herein collected.

TETRANYCHIDAE

In Tetranychidae, *T. cinnabarinus* and *E. banksi* were collected from four host plant species, meanwhile *T. urticae* was

Table 1. Some tetranychid and tenuipalpid mite species from natural vegetation growing in various municipalities from State of Lara.**Tabla 1.** Algunas especies de ácaros tetránquidos y tenuipálpidos presentes en vegetación natural de varias municipalidades del Estado Lara.

Mite species	Plant species	Locality
TENUIPALPIDAE		
<i>Brevipalpus phoenicis</i>	<i>Cassia siamea</i> (Caesalpinaceae)	Barquisimeto, Iribarren Mun.
	<i>Capparis linearis</i> (Capparidaceae)	Barquisimeto, Iribarren Mun.
	<i>Melicoccus bijugatus</i> (Sapindaceae)	Barquisimeto, Iribarren Mun.
	<i>Randia</i> sp. (Rubiaceae)	Barquisimeto, Iribarren Mun.
	<i>Spathodea campanulata</i> (Bignoniaceae)	Barquisimeto, Iribarren Mun.
<i>Tenuipalpus</i> sp.	<i>Spondias mombi</i> (Anacardiaceae)	Barquisimeto, Iribarren Mun.
TETRANYCHIDAE		
<i>Eotetranychus</i> cf. <i>willamettei</i>	<i>Sterculia apetala</i> (Sterculiaceae)	Barquisimeto, Iribarren Mun.
<i>Eutetranychus banksi</i>	<i>Cassia siamea</i> (Caesalpinaceae)	Barquisimeto, Iribarren Mun.
	<i>Chlorophora tinctoria</i> (Moraceae)	Barquisimeto, Iribarren Mun.
	<i>Dalechampia</i> sp. (Euphorbiaceae)	Barquisimeto, Iribarren Mun.
	<i>Malpighia glabra</i> (Malpighiaceae)	Tarabana, Palavecino Mun.
<i>Neotetranychus gloriosus</i>	<i>Croton</i> sp. (Euphorbiaceae)	San Miguel, Jimenez Mun.
<i>Oligonychus biharensis</i>	<i>Clitoria</i> sp. (Papilionaceae)	Barquisimeto, Iribarren Mun.
	<i>Ziziphus cyclocardia</i> (Rhamnaceae)	San Miguel, Jimenez Mun.
<i>Oligonychus</i> sp.	<i>S. campanulata</i> (Bignoniaceae)	Barquisimeto, Iribarren Mun.
<i>Tetranychus cinnabarinus</i>	<i>Convolvulus</i> sp. (Convolvulaceae)	Humocaro Bajo, Morán Mun.
	<i>Ipomoea</i> sp. (Convolvulaceae)	Humocaro Bajo, Morán Mun.
	<i>Leonotis nepetifolia</i> (Lamiaceae)	Humocaro Bajo, Morán Mun.
	<i>Lycopersicon</i> sp. (Solanaceae)	Campo Lindo, Jimenez, Mun.
<i>Tetranychus desertorum</i>	<i>Parthenium hysterophorus</i> (Asteraceae)	Quibor, Jimenez Mun.
<i>Tetranychus urticae</i>	<i>Enterolobium cyclocarpum</i> (Mimosaceae)	San Miguel, Jimenez Mun.
	<i>Euphorbia pulcherrima</i> (Euphorbiaceae)	Humocaro Bajo, Morán Mun.
	<i>Terminalia catappa</i> (Combretaceae)	Duaca, Crespo Mun.

collected from three host plant species. Additionally, *T. urticae* showed to be more widely spread, being found in three out of six municipalities sampled in from State of Lara, meanwhile *T. cinnabarinus* and *E. banksi* were collected from two different locations (Table 1). *T. urticae* is a worldwide pest occurring in about 960 host plant species, including vegetables, fruit trees and ornamentals provoking important economic damage (Ferro & Southwick 1984, Bolland et al. 1998). However, this pest mite species does not occur as generally on shade trees and shrubs (Weidhaas 1979).

Although *O. biharensis* and *T. desertorum* were only found in two and one plant species, respectively, these two mite species are considered polyphagous generalist, being reported in 53 and 193 host plant species, respectively (Bolland et al. 1998). *O. biharensis* occurs mainly in Asian countries, although it has been reported occurring in Mexico and Brazil (Bolland et al. 1998). It constitutes the first report on *Ziziphus cyclocardia* S. F. Blake from Venezuela. The observed "host preference" in *O. biharensis* could be related to more resources availability due to *Z. cyclocardia* is a ≈30 m tree which ensuring a continuous food flux for population. On the other hand, *T. desertorum* was collected in several others cultivated plant species that are not target in this study.

On the other hand, *E. cf. willamettei* and *N. gloriosus* were just found on *Sterculia apetala* and *Croton* sp., respectively. *Eotetranychus* cf. *willamettei* showed to be similar to *Eotetranychus willamettei* (McGregor, 1917) but they differ slightly in aedeagus shape, thus more exhaustive revisions are required to determine species status of Venezuelan specimens. According to Boland et al. (1998), *E. willamettei* has been recorded

in USA, primarily on species belonging to Rosaceae, however it has been also recorded on Aceraceae, Fagaceae, Polygonaceae, Ulmaceae and Vitaceae. On the other hand, *N. gloriosus* is known to occur in Mexico on *Croton ciliatoglanduliferus* Ortega, *Croton* sp., *Euphorbia* sp. (Tuttle et al. 1976) and others host plant species such as *Agave tequilana* F.A.C. Weber (Agavaceae) (Tuttle et al. 1974), *Piscidia piscipula* (L.) Sarg. (Fabaceae), *Piper* sp. (Piperaceae) (Estebanes-González & Baker 1968), *Sida* sp. (Malvaceae) and *Solanum* sp. (Solanaceae) (Tuttle et al. 1976).

Our results constitute the first survey made on plants growing in natural environments in state of Lara, Venezuela. However, more efforts should be addressed to better know mite diversity inhabiting natural vegetation since they are reservoirs of phytophagous mites and, also they potentially can harbor no described predator species that could be useful as biocontrol agents for agricultural pests.

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